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Description

This invention relates to a fifth wheel hitch for connection to a kingpin on a truck trailer, and useful on a truck tractor for highway use, or alternatively on stanchions of flatbed railway wagons for off-highway use, i.e. so-called piggy-back rail transport.

Various constructions of fifth wheel hitch are known. These normally employ a pair of jaws between which the kingpin can be entered and then releasably retained. There is described in US-3002767A a fifth wheel hitch assembly having a bearing plate with opposite lateral portions and with a rearwardly opening mouth and throat to receive a kingpin having a reduced diameter hitch portion and an enlarged lower head; and a pair of jaws at said throat on the underside of said bearing plate, to receive a kingpin, said jaws having arcuate surfaces to cooperatively receive the reduced diameter portion of the kingpin, the arcuate surface of one of the jaws facing generally rearwards and the other being shiftable between an open position and a closed position by a kingpin entering the throat, a locking plunger shiftable generally laterally between an unlock position and a lock position, in the latter of which said locking plunger lies in the path of said shiftable jaw when closed, to prevent said shiftable jaw from shifting to said open position, and manually operable means for shifting the locking plunger from the lock position to the unlock position. In this construction the manually operable means for shifting the locking plunger from the lock position to the unlock position comprises a simple pivoted lever having a grasping portion at one end and a nose at the other end engaged in a notch in the locking plunger. Such a simple and unsophisticated construction would be sloppy, unreliable and unsuitable for the incorporation of additional desirable operational and safety features. It is an object of the present invention to provide an alternative manually operable shifting means which will avoid these problems. Now according to the present invention, the shifting means comprises a cam slide slidable longitudinally of the bearing plate and having camming means cooperable with a cam follower movable with the locking plunger for shifting the locking plunger to the unlock position on longitudinal sliding of the cam slide, and manually operable lever means for sliding the cam slide. It will become apparent from the following discussion of the invention and various developments thereof that the invention provides many advantages over the prior construction described above.

Fifth wheel hitches used on flatbed railway wagons as for piggyback transport of truck trailers normally are mounted on top of a vertically collapsible stanchion. Because fifth wheels are particularly heavy, the elevation and lowering of this weight can present a practical problem. Efforts have been made heretofore to form a fifth wheel of aluminium, namely by casting the fifth

wheel plate of aluminium, to achieve lightweight construction. However, the cast aluminium was not of sufficient strength to withstand the stresses normally encountered. Thus, fifth wheel hitches are still of heavy steel construction. Not only is this weight a drawback on collapsible railway flatbed stanchions, but it also adds considerably to the weight of a conventional truck tractor. Moreover, projected plans for future railway transport of trailers include use of lightweight flatbed cars weighing only a fraction of today's conventional flatbed cars, to effect less expensive construction and also lighter, more sophisticated wheel bearings. Lowering the weight of the hitches would be desirable to accommodate these lightweight flatbeds.

Conventional fifth wheel hitches include a manual lever or actuator for releasing the kingpin when it is desired to disconnect the trailer. This lever normally projects from one side or the other of the fifth wheel hitch. Hitches employed on railway flat wagons preferably should be releasable by a workman walking along one side or the other of the truck trailers, moving from car to car, thereby enabling a crane to lift the trailers off the railway wagons. For safety reasons, it is inadvisable for the workman to have to move from one side of the railway wagons to the other for this operation. Thus, it would be desirable to have a fifth wheel hitch which could be released from both sides, so that, no matter which side of the flatbeds the worker is walking, he can remain on that side.

Whether the fifth wheel hitch is employed for on-highway or off-highway usage, wear of the jaws renders periodic adjustment advisable to minimize sloppiness of the kingpin in the jaws when connected and under motion. Prior fifth wheel hitches such as those described in US-A-2 663 575 and US-A-2 982 566 have employed wear adjustment devices, but adjustment has to be made at the inside of the throat of the hitch. Further, such adjustment can only be made when the fifth wheel is detached from the trailer and kingpin. Even then it is cumbersome to do because of minimal space for one's hands at that location, and the presence of grease and dirt. Thus, it would be desirable to have a fifth wheel hitch wherein the adjustment for jaw wear could be made even if the hitch is connected to a kingpin, and from the exterior of the hitch.

In the conventional fifth wheel hitch, the jaws are closed around the kingpin by the entering kingpin itself. It can occur that the kingpin on the trailer is slightly too high relative to the jaws so that the enlarged lower head of the kingpin, rather than the smaller diameter throat thereabove, enters and actuates the jaws to closed position. It is known to employ a lock guard that projects between the jaws and must be shifted down by the kingpin at a correct elevation (see US-A-2 982 566 at 58), but it would be advantageous to have mechanism preventing a swinging jaw from locking in such a situation and to have this unlocked condition visibly indicated, so that the operator

would immediately realize he must change the relative elevation between these components to achieve the effective inter engagement with the jaws locking only on the throat of the kingpin.

One or more of the problems set out above may be overcome by various developments of the present invention which are set out in the accompanying subsidiary claims. However, the preferred embodiment incorporating all of these aspects incorporates the following salient features among others not now adumbrated.

The fifth wheel hitch herein employs a set of jaws retained in a pocket on the underside of the bearing plate, the jaws being removable simply by unfastening of a retention cover, for simple, easy replacement of worn jaws or, if desired, substitution of other jaws that will accommodate different size kingpins. This aspect of the invention is also described and claimed in EP-0307006 (application number 88115786.1) which has been divided herefrom and to which reference is invited. The jaws are interconnected with each other for maximum intercooperation, but are not attached to the hitch plate as conventionally done. They are laterally and longitudinally retained in a pocket by special abutments protruding downwardly from the hitch wheel plate, and are vertically retained between the hitch plate and retention cover.

The fifth wheel hitch herein is useful on a truck tractor or on a flatbed railway wagon. Its special construction and configuration enables it to be manufactured of forged aluminium, so as to have adequate strength yet be relatively light in weight. Such a forging includes the bearing plate and integral depending abutments which form a pocket for laterally retaining the locking jaws, and to which the releasable cover is attached. This lightweight construction is advantageous for both on-highway and off-highway usage. The hitch may alternatively be constructed of other than aluminium, specifically by steel casting or steel fabrication.

The hitch has a fixed jaw and a swinging jaw, the latter including a unique closure finger at the bottom thereof, and projecting horizontally into the throat of the hitch so as to be engaged by the enlarged lower head of the entering kingpin for total closure of the jaws only when the kingpin is at the proper vertical elevation.

The fifth wheel hitch herein has a locking plunger which retains the jaws closed to prevent premature release of the kingpin, being biased toward this locked position, but unlike prior art plungers, being releasable by trigger means actuated by a properly vertically positioned entering kingpin, at the end of its entry; to allow the biasing means to shift the plunger to the locked position. The plunger is cammable to the release position by shifting a slide cam plate with an actuator extending from either or both sides of the hitch. The trigger means is also reactivated by this same slide cam plate shift.

The position of the locking plunger is adjustable from externally of the hitch, to adjust the plunger

in the direction normal to its direction of shift, i.e. toward the front of the hitch, to press the shiftable jaw further toward the stationary jaw. This enables optimum fit of the jaws around the kingpin even after wear has occurred on the kingpin and/or jaws. The adjustment mechanism incorporates a wedge movable in increments longitudinally of the hitch.

The invention may be carried into practice in various ways but one fifth wheel hitch embodying the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a bottom perspective view of the fifth wheel hitch;

Figures 2 to 4 constitute fragmentary perspective sequential views of the bottom side of the hitch, with the cover removed to allow viewing of the jaws and related components; Figure 2 showing the fifth wheel hitch in a completely disconnected condition; Figure 3 showing the partial entry of a kingpin and partial movement of the swinging jaw; and Figure 4 showing further entry of the kingpin into the hitch such that the swinging jaw is closed and the trigger mechanism is released to allow the cam plate and locking plunger to shift;

Figure 5 constitutes a fragmentary perspective view of the bottom of the hitch just unlocked and ready for disengagement of the kingpin therefrom;

Figure 6 is a partially sectioned, elevational view of the hitch, taken on plane VI-VI of Figure 1;

Figure 7 is a fragmentary perspective view of the underside of the fifth wheel hitch plate, with the cover, jaws, trigger and camming mechanisms removed therefrom to depict the forging itself; and

Figure 8 is an exploded perspective view of the components removed from the fifth wheel hitch in Figure 7.

As used herein, the term 'longitudinal of the hitch' refers to the fore to aft dimension of the hitch, while the term 'transversely of the hitch' refers to the side to side dimension. The terms forward, rearward, front end and rear end are in reference to the normal positioning of the hitch on a truck tractor or railway wagon. The term 'horizontal' encompasses the usual somewhat tilted positions of a hitch in use.

Referring now specifically to the drawings, the fifth wheel hitch 10 comprises a fifth wheel plate 12 having a flat upper bearing surface 14 (Figure 6) and a bifurcated rear portion formed of a pair of rearwardly extending projections 12a and 12b astraddle a tapered entering mouth 16 leading to a dead-end throat 18 for receiving a cooperative kingpin moving longitudinally relative to each other. The mouth is forwardly convergent in conventional fashion.

In the preferred embodiment, the fifth wheel plate 12 is an aluminium forging. It has a generally horizontal upper portion and a series of ribs or integral abutments depending downwardly. These abutments include a pair of lat-

erally spaced, generally parallel, depending abutment ribs or walls 20a and 20b (Figure 7) extending longitudinally of the hitch and preferably joined at the forward ends thereof to a transverse abutment wall 20c. Also projecting transversely from wall 20a toward mouth 16 is depending abutment 20d. Projecting transversely from wall 20b toward mouth 16 is abutment 20e. Extending beneath the mouth, between abutments 20d and 20e is a transverse U-shaped reinforcing ledge 23 (Figures 1 and 7).

Also extending inwardly from walls 20a and 20b are transversely oriented, respective partial abutments 20f and 20g opposite each other. Abutment 20g also has a portion which extends rearwardly at 20h and then transversely inwardly, i.e. toward throat 18, at 20i, such that these three portions 20g, 20h and 20i together form a generally U-shaped inwardly facing element. Generally opposite abutment 20i is abutment 20j projecting transversely inwardly from wall 20a forwardly of and spaced from abutment 20f. The combination of abutments 20g, 20h, 20i, 20j, 20f and wall abutment 20a forms a generally rectangular pocket 20m to receive the locking jaws as described hereinafter. Wall abutments 20a and 20b also include fastener receiving means, preferably in the form of threaded sockets 20-k and 20-l respectively, at the bottom thereof, for attachment of a releasable cover and jaw support plate beneath the locking components in a manner to be described.

Spaced outwardly from and parallel to walls 20a and 20b forming an integral part of the forging, is an additional pair of ribs or walls 22a and 22b (Figure 1), defining a pair of spaces 24a and 24b with walls 20a and 20b. Within these spaces can be included pivotal mount elements 25 shown in Figure 1. Such allows the hitch to be used for on-highway purposes, or alternatively, to mount the hitch atop a stanchion on a flatbed railway wagon for piggy-back off-highway usage. The configuration depicted allows it to be used with various stanchions now available. Conventional resilient elements 26a and 26b may be located in these spaces to enable limited hitch articulation on the stanchion in known manner, being attached by bolts to transverse walls 22c and 22d extending between walls 20a and 22a, and 20b and 22b, respectively.

The hitch is adapted to connect to a conventional kingpin 30 which, as is known, is generally cylindrical in configuration, projecting downwardly from the forward end of a trailer, including an enlarged lower head, a smaller diameter throat thereabove, and another enlarged upper body portion closest to the underside of the trailer. The typical dimensional difference between the head and throat is depicted by the two concentric dotted circles shown at 30 in the hitch in Figure 1. For example, on a conventional two-inch (50.8 mm) kingpin, the diameter of the head and body is two and thirteen-sixteenths inches (71.4 mm) and that of the throat is two inches (50.8 mm).

The hitch is capable of locking with this kingpin

30 or disengaging therefrom with a pair of jaws 32 and 34. Specifically, stationary jaw 32 has a rearwardly facing semicircular cavity 32a (Figure 8) and cooperates with pivotally shiftable jaw 34 having a generally semicircular shaped cooperative cavity 34a. Cavity 34a is movable into mating position with cavity 32a of jaw 32 for locking around the kingpin throat. The curvature of rearwardly facing cavity 32a and forwardly facing cavity 34a basically matches the cylindrical curvature of the kingpin throat.

Jaw 32 is shown to be generally rectangular in shape. It fits into a correspondingly shaped pocket 20m previously described. It is stationary in this position, its curved cavity 32a basically in alignment with the curved inner dead end of throat 18. Jaw 32 abuts along its lateral side edges with portions 20h and the inside surface of wall abutment 20a. Its forward walls abut the rearward surfaces of abutments 20i and 20j, and its rearward wall abuts against abutments 20f and 20g. These prevent the jaw from shifting laterally, forwardly or rearwardly.

Projecting downwardly from jaw 32, laterally offset from throat 18 is a pivot pin 32b. In pivotal jaw 34 is a cylindrical opening 34b of the same diameter as pin 32b, to fit thereover and thereby form a pivotal connection of jaw 34 on jaw 32. Pivotal jaw 34 thus can shift from an open, unlock position, depicted in Figure 2 for example, to allow passage of a kingpin, to a fully closed lock position, depicted in Figures 1 and 5 for example, behind a kingpin. It is biased to one or the other of these two positions by an overcentre biasing means depicted as a coil spring 38 around a pin 40, one end of the pin being pivotally connected to an ear 34g on pivotal jaw 34. The spring 38 is compressed between a fixed washer 42 against an abutment 40a on rod 40 on one end of the spring, and the fifth wheel plate abutment 20d on the other end of the spring.

The hitch includes a transversely movable locking plunger 46 capable of shifting between a retracted, jaw release position toward abutment wall 20b as in Figures 2 and 3, and an extended jaw locking position to the rear of closed pivotal jaw 34 as depicted in Figures 4 and 1. This plunger is biased toward the extended lock position by a coil compression spring 48 trapped between a spring pocket in the outer end of the plunger and the inner face of wall 20b. It can be retained in retracted position against the force of this biasing spring by cooperative action with a slide cam plate 50. Plunger 46 has an inner nose 46c which can be engaged by a camming nose 34e (Figure 3) of jaw 34 when this jaw is moving therepast. Plunger 46 includes a cam follower 46a, preferably in the shape of a cylindrical pin projecting downwardly from the plunger and fitting into a configured cam slot 50a in slide plate 50. This slide plate is movable only in one dimension, forwardly and rearwardly, being restrained laterally by the interfit of a pair of fixed guide pins 52 and 54 projecting into fore to aft elongated slots 50b and 50c in the slide plate. Configured cam

slot 50a includes a forward end socket 50a' (Figure 2) for receiving cam follower 46a when the slide cam plate is to its rearwardmost position, for retaining plunger 46 in retracted position against biasing spring 48. The biasing force of plunger spring 48 is greater than that of cam slide plate spring 71 (to be described) to retain plunger 46 in its retracted position at socket 50a' until the cam slide plate 50 is purposely shifted. This configured slot 50a also includes a rearward end socket 50a'' (Figure 2), displaced laterally from the forward end socket, for retaining cam follower 46a in the plunger release position when the slide cam plate is in its forwardmost position and plunger 46 projects transversely behind the closed swinging jaw 34, biased by plunger spring 48, to lock the jaw closed. Between these two sockets is a diagonally sloped camming surface for laterally shifting the cam follower and plunger to retracted unlocked position when the slide plate is purposely shifted longitudinally rearwardly. Forward shifting of the slide plate allows the cam follower to release the plunger for lateral extension thereof into its lock position.

Rearward movement of slide cam plate 50 to retract plunger 46 from its lock position to its unlock position is achieved by an actuator mechanism to be described. Forward movement of the slide cam plate to allow the plunger to be shifted from its unlock position to its lock position is achieved by the action of a biasing mechanism when released by a trigger mechanism to be described.

This shifting of the slide cam plate from the forward plunger release, lock position, rearwardly to the plunger retraction unlock position is achieved through use of one of two actuator levers 60 and 62 which project laterally from opposite sides of the hitch. These two levers allow this actuation from either side of the hitch. These two levers are pivotally connected to each other at their inner ends by a pivot pin 64. They extend out through orifices 20a' and 20b', respectively, (Figure 1) in the forward portions of respective side walls 20a and 20b (Figure 3) to pivot on the ends of these orifices. Lever 62 is pivotally attached by pin 66 to the forward portion of slide cam plate 50. Either lever can be manually forced forwardly to cause the lever to pivot on the forward end of the orifice through which it projects. Forward movement of the outer ends of either of the levers 60 or 62 from the rearward position (solid lines in Figure 1) to the forward position (phantom lines in Figure 1) will force pivot pin 64 connecting these links rearwardly toward throat 18, thereby also forcing pivot pin 66 and slide cam 50 rearwardly. This causes the sloped cam surface of configured slot 50a to force cam follower 46a laterally outwardly toward wall 20b and thereby retract plunger 46 away from pivotal jaw 34. This action movement of cam plate 50 is against the bias of the compression coil spring 71 which extends between a boss 20g' on transverse abutment 20g and a flange 50d (Figure 1) projecting from and secured to the forward end

portion of slide cam 50. Flange 50d moves forwardly and rearwardly with slide cam plate 50.

Also secured to flange 50d is an indicator pin 70 shiftable between a recessed position within the confines of transverse wall 20c and thereby out of sight to an observer (e.g. Figures 3 and 5) and an extended position projecting through an opening in forward transverse wall 20c (Figure 1). This indicator pin can be used to quickly indicate to the operator or other observer whether the hitch mechanism is properly locked or not. It visibly projects from the front of the wheel only when the hitch is properly locked. If desired, and as explained hereinafter this pin can alternatively be made to be visible when the hitch is not locked, so as to be out of sight only when the hitch is locked.

As mentioned previously, slide cam 50 is released by trigger mechanism to move from its rearward position to its forward position under the bias of compression coil spring 71. The trigger mechanism includes a lever 74 pivotal intermediate its ends on a pin 76 (Figure 3), having a downwardly protruding flange 74a at the forward end thereof to engage behind flange 50d of slide cam 50, to prevent the slide cam from moving forwardly when the trigger is cocked, the trigger being biased to this position by a compression coil spring 78 around a guide rod 80'. Rod 80' has one end attached to trigger lever 74 and the other end passing through a slide flange 12' (Figure 7) projecting downwardly from hitch plate 12. Trigger 74 includes a rearward end portion projecting chordally of the dead end of throat 18 to be engaged by the side periphery of the lower head of the kingpin at the final stage of movement of an entering kingpin as the throat of the kingpin engages jaw 32. This shifts the trigger away from throat 18 to cause the trigger to pivot about pin 76 in a clockwise direction as viewed from beneath (Figure 1), against the bias of compression spring 78, to shift flange 74a out of engagement in front of flange 50d of slide cam 50, thereby allowing the slide cam to be shifted under the force of its biasing spring 70 to its forward position, thus releasing locking plunger 46 in the manner indicated previously. The plunger shifts laterally under the force of its spring 48 behind jaw 34 to lock it closed. Moreover the plunger cannot be forcefully shifted from this lock position by some lateral thrust on it because its follower 46a is laterally restrained in socket 50a' under the bias of spring 48.

Pivotal jaw 34 includes a finger 34e which is located at the bottom of the jaw, and which, in the open position of the jaw, projects into the area beneath throat 18 of the fifth wheel plate, to be engaged by the enlarged lower head of an entering kingpin 30. This engagement of the head of kingpin 30 with finger 34e causes jaw 34 to be pivoted from its open position depicted in Figure 2, through the pivotal sequence depicted in Figures 3 and 4 to the closed position wherein the kingpin is between the two jaws. The location of this finger at the lower portion of jaw 34 is such that, if the kingpin is elevated more than a

predetermined fraction of an inch, e.g. approximately one-half inch (12.7 mm), relative to the jaws, so as to not be vertically aligned, the kingpin head will not contact this finger and thus pivotal jaw 34 will not be shifted to its closed position. This is a safety feature to prevent the jaw from being closed upon the head of the kingpin rather than upon the throat thereof.

The nose 46c of plunger 46 projects slightly into the path of camming nose 34e of jaw 34 such that jaw 34, when pivoting toward the closed position (see Figures 3 and 4), momentarily pushes plunger 46 outwardly against its spring 48 until the jaw passes the plunger.

The hitch provides externally accessible plunger adjustment means for effecting close fit of the jaws on a kingpin. This is particularly useful in the event of a somewhat worn kingpin and/or somewhat worn jaws. In such event, the kingpin throat diameter will be slightly smaller and/or the jaw cavities 32a and 34a slightly larger in diameter. The rear surface 46f (the term "rear" is used relative to the hitch front and rear ends) of plunger 46 abuts the forward face 80a of a wedge element 80 (Figure 8). The opposite face 80b of element 80 is tapered and abuts a correspondingly slanted fixed bearing surface of the integral abutment 20j of the hitch plate. An adjustment bolt 82 (Figure 8) extends through a hole 80c in wedge element 80 and into threaded engagement in a threaded socket of abutment 20j (Figure 1). A compression coil spring 84 around bolt 82 retains the wedge snugly in its various adjusted positions. The head of bolt 82 is directly accessible through a suitable opening 83 (Figure 1) in wall 20b as by an Allen wrench. Forcing wedge element 80 transversely inwardly toward throat 18 forces plunger 46 longitudinally forwardly against the rear of closed jaw 34 to shift jaw 34 further toward jaw 32.

Adjustment in the opposite direction is just as readily accomplished. Adjustment can moreover be achieved with the hitch coupled on a kingpin or uncoupled, a distinct advantage to achieve optimum fit and to avoid the prior necessity to unhitch and remove the trailer. The ready access to the adjuster also encourages the operator to do any necessary adjustment without the necessity to operate through the greasy hitch throat. If desired, initial adjustment can be performed at the factory and a plug placed in opening 83 to prevent later access.

The jaws 32 and 34, and the rear end of slide cam 50, are retained in position and supported by the underlying retention cover and support plate 90. Plate 90 is removably, i.e. releasably, attached to the bottoms of walls 20a and 20b of the hitch by fasteners such as bolts 92 that thread into sockets 20k, by pivot pin bolt 76 and bolt 92', the latter two at the front end of plate 90. Thus the jaws are vertically secured between this underlying retention plate and the overlying hitch plate 12. Removal of the jaws is thus readily effected by removal of plate 90 and dropping the jaws, or if the hitch is inverted, lifting jaw 32 out of pocket

20m along with jaw 34. Replacement of worn jaws is accomplished merely by inserting another set and replacing plate 90. Wear is limited to the jaws as opposed to the hitch plate socket so that repair of the hitch is achieved by the single jaw replacement rather than welding and grinding of the socket of the fifth wheel forging. If it is desired to insert different jaws accommodating a different size kingpin, this substitution is just as readily achieved.

The jaws rest on cover plate 90. It is preferably made of high strength steel. Inadvertent lowering of a kingpin onto the jaws therefor, and particularly on the closing finger of the swinging jaw, does not result in damage to the jaws because the stress is transferred to the strong and securely fastened, underlying cover plate.

Although the operation of the apparatus is generally explained above and is apparent from the description of the apparatus, the sequence will be briefly repeated to assure complete clarity. Assuming that the jaws are positioned in the hitch assembly and all components being in place, and the jaws being in the open receptive condition depicted in Figure 2, the relative movement between the hitch and a kingpin 30 at the correct corresponding elevation will cause the kingpin to enter mouth 16 and move into throat 18 until the enlarged lower head of kingpin 30 engages closing finger 34e of open jaw 34. (Although the kingpin is described for convenience as moving into the hitch, it will be realised that typically the hitch is moving toward the kingpin, but the relative movement is the same.) Jaw 34 thus is pivoted about pivot pin 32b toward jaw 32. When jaw 34 is partially closed as depicted in Figure 3, its cam nose 34e engages nose 46c of extending plunger 46, such that further closure movement of jaw 34 causes plunger 46 to be momentarily further depressed against its coil compression spring 48. With this movement, cam follower 46a on plunger 46 moves transversely across configured slot 50a in cam plate 50. Closure of jaw 34 also causes momentary compression of coil spring 38 of the overcentre biasing device for this jaw. As jaw 34 is moved completely closed, as in Figure 4, the kingpin engages against the socket 32a of stationary jaw 32, and the enlarged head of the kingpin engages the protruding end of trigger 74, shifting it laterally against the bias of spring 78, so as to pivot the trigger about pin 76 and thereby shift its retention flange 74a away from in front of protruding flange 50d of slide cam 50. This releases flange 50d to move forwardly to its second position depicted in Figure 1, along with releasing the rest of the slide cam to allow its compression spring 71 to shift it totally forwardly, longitudinally of the hitch, which results in the cam follower 46a of plunger 46 fitting snugly in end socket 50a'' as in Figure 4, preventing the locking plunger from being accidentally forcibly moved from its extended lock position behind jaw 34. Simultaneously, the forward shift of cam plate 50 causes indicator rod 70 to protrude from the forward end of the hitch as in Figures 1 and 4,

clearly indicating to an operator or observer that the hitch is fully locked.

When it is desired to release the hitch, the outer extending end of lever 60, or alternatively lever 62, is forcefully shifted forwardly of the hitch, causing rearward movement of pivot pin 64 connecting these levers, and also of pivot pin 60 connecting the levers to slide plate 50. This forces slide plate 50 rearwardly against the bias of spring 71, causing cam follower 46a of plunger 46 to be engaged by the sloped diagonal camming surface of configured slot 50a of plate 50, and to ride therealong to depress plunger 46 transversely outwardly from its locking position behind jaw 34, against the bias of spring 48. Further longitudinal shifting of cam plate 50 causes follower 46a to fit snugly into the recessed socket 50a' at the forward end of cam plate 50, to retain the plunger in its retracted position. Spring 48 retains it in this position, having greater biasing force than that of spring 71. In this condition, indicator rod 70 is retracted within the fifth wheel, i.e. out of sight, while biasing spring 78 moves the trigger mechanism flange 74a again in front of flange 50d so as to restrain the cam plate in this rearward position. Relative movement of kingpin 30 then toward the rear of the hitch allows it to pivot jaw 34 open against the bias of its overcentre spring 38, the cam nose 34e of the jaw momentarily shifting plunger 46 slightly further so that cam follower 46a also shifts slightly and then falls back into its recess socket 50a'. The hitch is then disengaged, and is also set for re-engagement as necessary.

As explained in detail herebefore, if it is desired to connect the hitch to a different size kingpin, or to replace worn jaws, cover plate 90 is simply removed by removing the fasteners, the jaws are dropped out, or lifted out if the hitch is in inverted position, a new pair of jaws inserted, the plate replaced, and the unit is ready for operation. Also, as indicated previously, as the kingpin and/or jaws wear, adjustment can be readily made from the lateral outside of the hitch by inserting a simple Allen wrench or the equivalent through the opening in wall 20b (Figure 1), to engage bolt 82, adjusting it and thereby wedge 80 transversely of the hitch to shift plunger 46 longitudinally of the hitch, i.e. transversely of the plunger, the desired amount, to force movable jaw 34 with appropriate pressure against the kingpin and indirectly stationary jaw 32. This can be done without reaching into the throat as with prior units, and can even be achieved while the hitch is coupled, for optimum adjustment.

It is conceivable that certain features of this novel hitch may be employed without other features, and/or may be modified in various ways to accommodate a particular arrangement for stanchion use on railway flatbed wagons and/or truck tractor use for highway purposes. One such variation is to have the diagonal cam surface of cam plate 50 oriented forwardly-outwardly instead of the rearwardly-outwardly orientation depicted; i.e. opening 50a would be the reverse of its shown orientation, with socket 50a' toward the rear and

50a'' toward the front. Thus, plunger retraction would be in response to forward movement of the cam plate rather than rearward movement thereof. And indicator pin 70 would protrude from the forward end of the hitch when the hitch is connected rather than disconnected. The basic function of the apparatus would be the same.

Claims

1. A fifth wheel hitch assembly having a bearing plate (12) with opposite lateral portions (12a, 12b) and with a rearwardly opening mouth (16) and throat (18) to receive a kingpin having a reduced diameter hitch portion and an enlarged lower head; and a pair of jaws (32, 34) at said throat on the underside of said bearing plate, to receive a kingpin, said jaws having arcuate surfaces (32a, 34a) to cooperatively receive the reduced diameter portion of the kingpin, the arcuate surface of one (32) of the jaws facing generally rearwards and the other (34) being shiftable between an open position and a closed position by a kingpin entering the throat, a locking plunger (46) shiftable generally laterally between an unlock position and a lock position, in the latter of which said locking plunger lies in the path of said shiftable jaw when closed, to prevent said shiftable jaw from shifting to said open position, and manually operable means for shifting the locking plunger from the lock position to the unlock position, characterised in that the shifting means comprises a cam slide (50) slidably longitudinally of the bearing plate (12) and having camming means (50a) cooperable with a cam follower (46a) movable with the locking plunger (46) for shifting the locking plunger to the unlock position on longitudinal sliding of the cam slide, and manually operable lever means (60, 62) for sliding the cam slide.

2. A hitch assembly according to claim 1 in which the said one jaw (32) is fixed relative to the bearing plate (12).

3. A hitch assembly according to claim 1 or claim 2 which includes means (48) biasing said locking plunger toward said lock position, and trigger release means (46a, 50a, 50, 74) operatively associated with said locking plunger and positioned adjacent said throat to be actuatable by an entering kingpin for releasing said locking plunger into its lock position.

4. A hitch assembly according to claim 3 in which the trigger release means (74) is vertically positioned to be engaged by the enlarged lower head of the entering kingpin.

5. A hitch assembly according to claim 3 or claim 4 which also includes trigger reset means for resetting said trigger release means with shifting of said locking plunger to said unlock position.

6. A hitch assembly according to any of claims 1 to 5 in which the lever means (60, 62) extends laterally from both sides of said hitch to allow unlocking from either side.

7. A hitch assembly according to any of claims 1 to 6 which includes adjustment means (80, 82) for said locking plunger accessible from one of said

opposite lateral portions and engaging said plunger, said adjustment means being controllably movable and capable of longitudinally adjusting the position of said plunger toward or away from said shiftable jaw when in said closed position, to accommodate wear of a kingpin and/or of said jaws.

8. A hitch assembly according to Claim 7 in which the adjustment means comprising a wedge element (80) movable transversely of said hitch to effect the longitudinal plunger adjustment.

9. A hitch assembly according to Claim 8 in which the adjustment means includes a threaded member (82) which is what is accessible from said one of said lateral hitch portions, and which engages said wedge element (80) for adjustable movement thereof.

10. A hitch assembly according to any of claims 1 to 9 which includes a closure finger (34c) on the underside of said shiftable jaw, projecting generally horizontally into alignment with said throat, and radially and axially offset relative to said arcuate surfaces of said shiftable jaw to be engaged by the enlarged lower head of an entering kingpin for shifting closure of said shiftable jaw, said underside location of said finger causing a kingpin at an elevated position to miss said finger and thereby fail to shift said finger and said shiftable jaw to said closed position.

11. A hitch assembly according to any of Claims 1 to 10 in which the shiftable jaw (34) is pivotally mounted to shift between said open and closed positions.

12. A hitch assembly according to any of Claims 1 to 11 which includes over-centre biasing means (38, 40) for normally biasing said shiftable jaw to one or the other of said open and closed positions.

Patentansprüche

1. Schleppersattel-Kupplung mit einer Lagerplatte (12) mit gegenüberliegenden Seitenbereichen (12a, 12b) und einer rückseitigen Aufnahmeöffnung (16) und Kehle (18), um einen Königszapfen mit einem Kupplungsbereich mit reduziertem Durchmesser und einem vergrößerten unteren Kopf aufzunehmen, mit einem Paar an der Kehle an der Unterseite der Lagerplatte angeordneter Klemmbacken (32, 34), welche zur Aufnahme eines Königszapfens kreisbogenförmige Flächen (32a, 34a) aufweisen, um den Bereich reduzierten Durchmessers des Königszapfens zusammenwirkend aufzunehmen, wobei die kreisbogenförmige Fläche der einen Klemmbacke (32) im wesentlichen nach hinten gerichtet ist, während die andere (34) zwischen einer offenen und einer geschlossenen Position durch einen in die Kehle eingeführten Königszapfen verschiebbar ist, mit einem Verschlußzapfen (46), der im wesentlichen seitlich zwischen einer unverschlossenen und einer verschlossenen Position verschiebbar ist, wobei er in letzterer in der Bewegungsbahn der verschiebbaren Klemmbacke ist, wenn diese geschlossen ist, um ein Verschieben der ver-

schiebbaren Klemmbacke in die geöffnete Position zu verbinden, sowie mit einer von Hand bedienbaren Vorrichtung zum Verschieben des Verschlußzapfens aus der Verschlußposition in die unverschlossene Position, dadurch gekennzeichnet, daß die Verschiebevorrichtung einen Nockenschieber (50) aufweist, der in Längsrichtung der Lagerplatte (12) verschiebbar ist und eine Kurvenbahn (50a) besitzt, die mit einem mit dem Verschlußzapfen (46) beweglichen Nockenstößel (46a) zusammenwirkt, um den Verschlußzapfen bei Längsbewegung des Nockenschiebers in die unverschlossene Position zu verschieben, sowie eine manuell bedienbare Hebelvorrichtung (60, 62) zum Verschieben des Nockenschiebers.

2. Schleppersattel-Kupplung nach Anspruch 1, dadurch gekennzeichnet, daß eine der Klemmbacken (32) relativ zur Lagerplatte (12) fixiert ist.

3. Schleppersattel-Kupplung nach Anspruch 1 oder 2, gekennzeichnet durch eine Vorrichtung (48) zum Vorspannen des Verschlußzapfens in Richtung der verschlossenen Position, sowie durch Auslösevorrichtungen (46a, 50a, 50, 74), die betriebsmäßig mit dem Verschlußzapfen zusammenwirken und nahe der Kehle angeordnet sind, um durch einen eingeführten Königszapfen zur Auslösung des Verschlußzapfens in seine Verschlußposition betätigbar zu sein.

4. Schleppersattel-Kupplung nach Anspruch 3, dadurch gekennzeichnet, daß die Auslösevorrichtung (74) senkrecht angeordnet ist, um mit dem vergrößerten unteren Kopf des eingeführten Königszapfens in Eingriff zu kommen.

5. Schleppersattel-Kupplung nach Anspruch 3 oder 4, gekennzeichnet durch eine Rückstellvorrichtung zum Rückstellen der Auslösevorrichtung beim Verschieben des Verschlußzapfens in die unverschlossene Position.

6. Schleppersattel-Kupplung nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Hebelvorrichtung (60, 62) an beiden Seiten der Kupplung seitlich heraussteht, um ein Öffnen von jeder Seite zuzulassen.

7. Schleppersattel-Kupplung nach einem der Ansprüche 1 bis 6, gekennzeichnet durch eine Einstellvorrichtung (80, 82) für den Verschlußzapfen, die von einer der gegenüberliegenden seitlichen Bereiche zugänglich ist und mit dem Verschlußzapfen in Eingriff steht und welche kontrollierbar beweglich ist, um die Position des Verschlußzapfens in Längsrichtung einzustellen, und zwar zu der beweglichen Klemmbacke hin oder von dieser weg, wenn diese in der geschlossenen Position ist, um einem Verschleiß eines Königszapfens und/oder der Klemmbacken auszugleichen.

8. Schleppersattel-Kupplung nach Anspruch 7, dadurch gekennzeichnet, daß die Einstellvorrichtung ein Keilelement (80) aufweist, welches quer zur Kupplung beweglich ist, um die Längsrichtungseinstellung des Verschlußzapfens zu bewirken.

9. Schleppersattel-Kupplung nach Anspruch 8, dadurch gekennzeichnet, daß die Einstellvorrichtung ein Gewindeteil (82) aufweist, welches von

einer der beiden seitlichen Bereiche zugänglich und mit dem Keilelement (80) zur Einstellung in Eingriff steht.

10. Schleppersattel-Kupplung nach einem der Ansprüche 1 bis 9, gekennzeichnet durch einen Verschlußfinger (34c) an der Unterseite der beweglichen Klemmbacke, welcher im wesentlichen horizontal in Ausrichtung mit der Kehle vorsteht und radial und axial relativ zur kreisbogenförmigen Fläche der verschiebbaren Klemmbacke versetzt ist, um mit dem vergrößerten unteren Kopf eines eingeführten Königszapfen zum Verschieben der verschiebbaren Klemmbacke in Schließrichtung in Eingriff zu sein, wobei die Anordnung des Fingers an der Unterseite bewirkt, daß ein Königszapfen in einer angehobenen Position den Finger verfehlt und ein Versetzen des Fingers und der verschiebbaren Klemmbacke in die geschlossene Position verhindert ist.

11. Schleppersattel-Kupplung nach einem der Ansprüche 1 bis 10, dadurch gekennzeichnet, daß die verschiebbare Klemmbacke (34) schwenkbar befestigt ist, um zwischen der geöffneten und geschlossenen Position verschiebbar zu sein.

12. Schleppersattel-Kupplung nach einem der Ansprüche 1 bis 11, gekennzeichnet durch ein über die Mittelstellung (over-centre) vorspannendes Element (38, 40), welches normalerweise die verschiebbare Klemmbacke in die eine oder die andere der geöffneten oder geschlossenen Position vorspannt.

Revendications

1. Dispositif d'attelage possédant une sellette (12) présentant des portions latérales opposées (12a, 12b) et une bouche (16) s'ouvrant vers l'arrière ainsi qu'une gorge (18) destinée à recevoir un pivot qui possède de une portion d'attelage de diamètre réduit et une tête inférieure élargie; et une paire de mâchoires (32, 34) prévues dans la région de ladite gorge, sur la face inférieure de ladite sellette, pour recevoir un pivot, lesdites mâchoires présentant des surfaces courbes (32a, 34a) destinées à recevoir en coopération la portion de diamètre réduit du pivot, la surface courbe de l'une (32) des mâchoires regardant sensiblement vers l'arrière et l'autre (34) pouvant se déplacer entre une position ouverte et une position fermée sous l'effet de l'entrée d'un pivot dans la gorge, un plongeur de verrouillage (46) qui peut se déplacer de façon générale latéralement entre une position de déverrouillage et une position de verrouillage, dans la dernière desquelles ledit plongeur de verrouillage se trouve sur le trajet de ladite mâchoire mobile lorsqu'elle est fermée, pour empêcher ladite mâchoire mobile de passer à ladite position ouverte, et des moyens pouvant être actionnés manuellement et servant à déplacer le plongeur de verrouillage de la position de verrouillage à la position de déverrouillage, caractérisé en ce que les moyens de déplacement comprennent un coulisseau à came (50) qu'on peut faire coulisser dans la direction longitudinale de la sellette (12) et qui possède des

moyens à effet de came (50a) qui peuvent coopérer avec une contre-came (46a) qui se déplace avec le plongeur de verrouillage (46) pour amener le plongeur de verrouillage à la position de déverrouillage en réponse au coulisement longitudinal du coulisseau à came, et des moyens à levier (60, 62) pouvant être manoeuvrés manuellement et qui servent à faire coulisser le coulisseau à came.

2. Ensemble d'attelage selon la revendication 1, dans lequel ladite première mâchoire (32) est fixe par rapport à la sellette (12).

3. Ensemble d'attelage selon la revendication 1 ou la revendication 2, qui comprend des moyens (48) sollicitant ledit plongeur de verrouillage vers ladite position de verrouillage, et des moyens de dégagement à déclencheur (46a, 50a, 50, 74) associés fonctionnellement audit plongeur de verrouillage et positionnés adjacents à ladite gorge pour pouvoir être actionnés par l'entrée d'un pivot de façon à libérer ledit plongeur de verrouillage pour qu'il prenne sa position de verrouillage.

4. Ensemble d'attelage selon la revendication 3, dans lequel les moyens de dégagement à déclencheur (74) sont positionnés à un niveau tel qu'ils soient attaqués par la tête inférieure élargie du pivot lorsqu'il entre.

5. Ensemble d'attelage selon la revendication 3 ou la revendication 4, qui comprend en outre des moyens de réarmement du déclencheur servant à réarmer lesdits moyens de dégagement à déclencheur lors de l'amenée dudit plongeur de verrouillage à ladite position de déverrouillage.

6. Ensemble d'attelage selon une quelconque des revendications 1 à 5, dans lequel les moyens à levier (60, 62) font saillie latéralement sur les deux côtés dudit attelage pour permettre de déverrouiller de chaque côté.

7. Ensemble d'attelage selon une quelconque des revendications 1 à 6, qui comprend des moyens de réglage (80, 82) destinés à agir sur le plongeur de verrouillage et qui sont accessibles de l'une desdites portions latérales opposées et attaquent ledit plongeur, lesdits moyens de réglage pouvant se déplacer de façon commandée et étant capables de régler longitudinalement la position dudit plongeur dans le sens qui le rapproche ou dans le sens qui l'éloigne de ladite mâchoire mobile lorsqu'elle se trouve dans ladite position fermée, de manière à compenser l'usure d'un pivot et/ou desdites mâchoires.

8. Ensemble d'attelage selon la revendication 7, dans lequel les moyens de réglage comprennent un élément en coin (80) qui peut se déplacer dans la direction transversale dudit attelage pour effectuer le réglage longitudinal du plongeur.

9. Ensemble d'attelage selon la revendication 8, dans lequel les moyens de réglage comprennent un élément fileté (82) qui constitue ce qui est accessible de l'une desdites portions latérales de l'attelage, et qui attaque ledit élément en forme de coin (80) pour lui imprimer le mouvement de réglage.

10. Ensemble d'attelage selon une quelconque

des revendications 1 à 9, qui comprend un doigt de fermeture (34c) prévu sur la face inférieure de ladite mâchoire mobile, qui fait saillie sensiblement horizontalement en se plaçant dans l'alignement de ladite gorge, et qui est déporté radialement et axialement par rapport auxdites surfaces courbes de ladite mâchoire mobile pour être attaqué par la tête inférieure élargie d'un pivot lorsqu'il entre pour provoquer la fermeture de ladite mâchoire mobile, ladite position inférieure dudit doigt ayant pour effet qu'un pivot placé en position haute manque ledit doigt et, de cette

façon, ne peut pas amener ledit doigt et la mâchoire mobile à ladite position fermée.

11. Ensemble d'attelage selon une quelconque des revendications 1 à 10, dans lequel la mâchoire mobile (34) est montée pivotante pour se déplacer entre lesdites positions ouverte et fermée.

12. Ensemble d'attelage selon une quelconque des revendications 1 à 11, qui comprend des moyens de sollicitation à franchissement de point mort qui tendent normalement à placer ladite mâchoire mobile dans l'une ou l'autre desdites positions ouverte et fermée.

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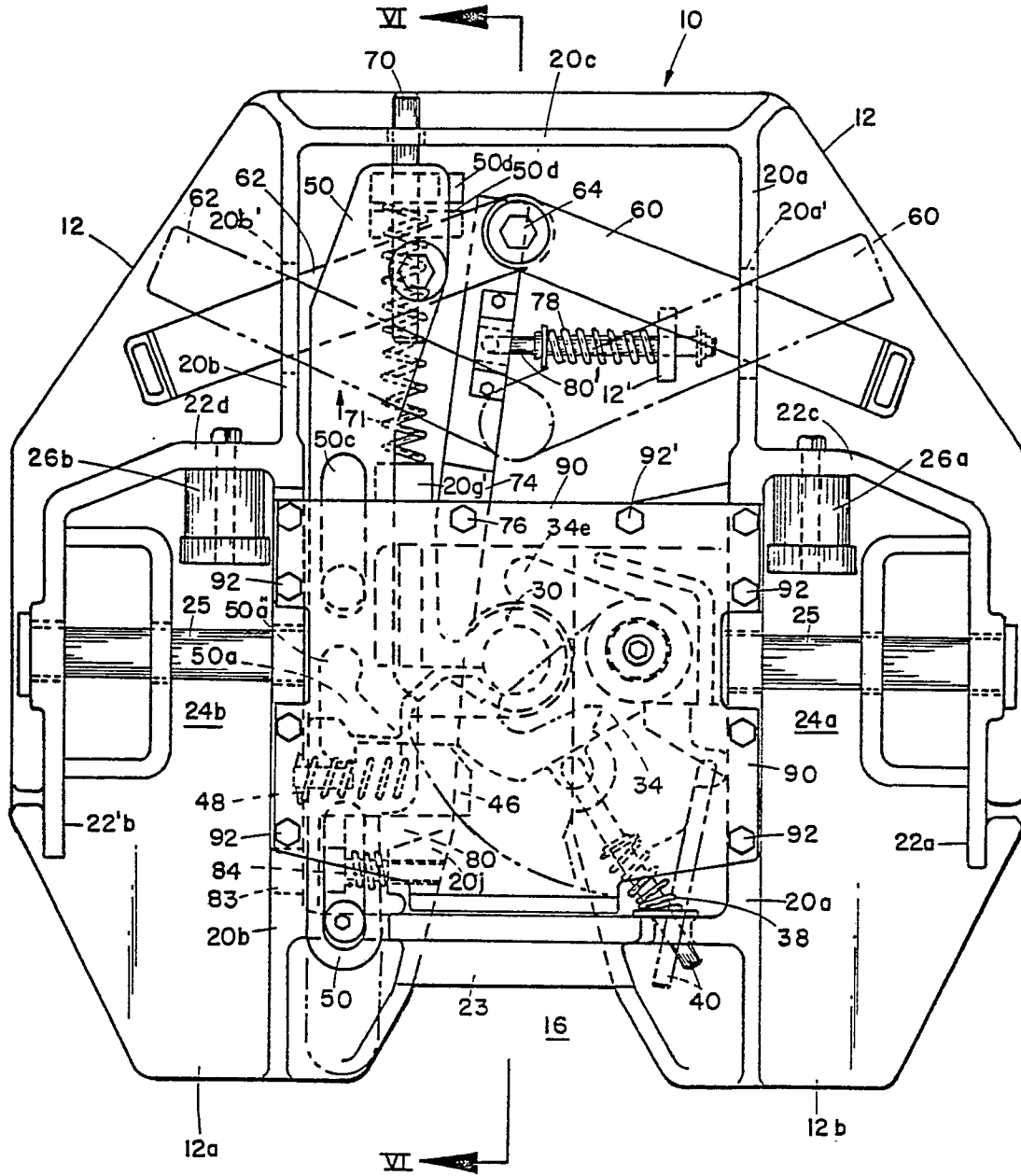


FIG 1

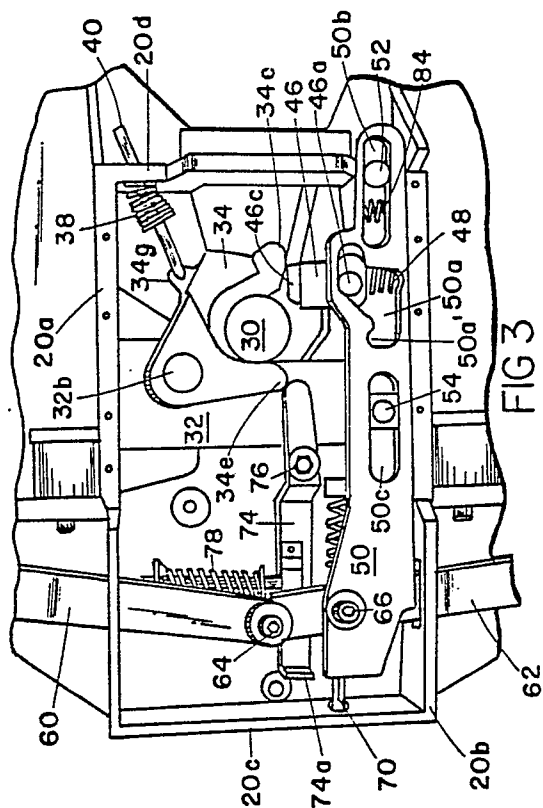


FIG 3

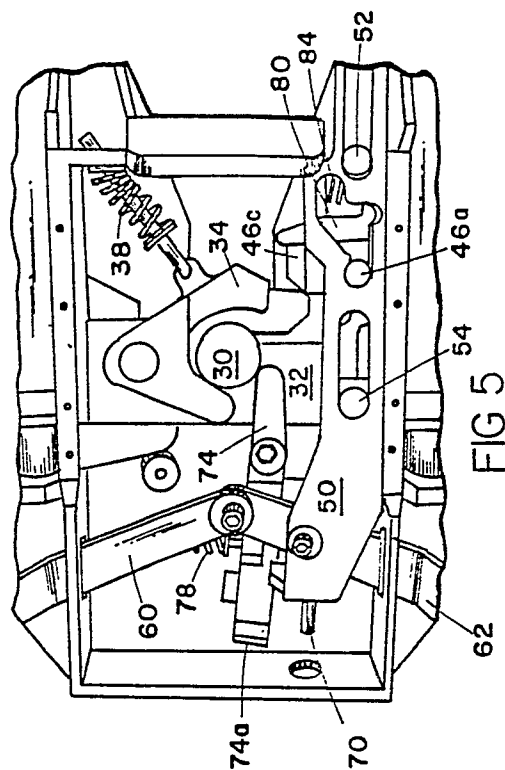


FIG 5

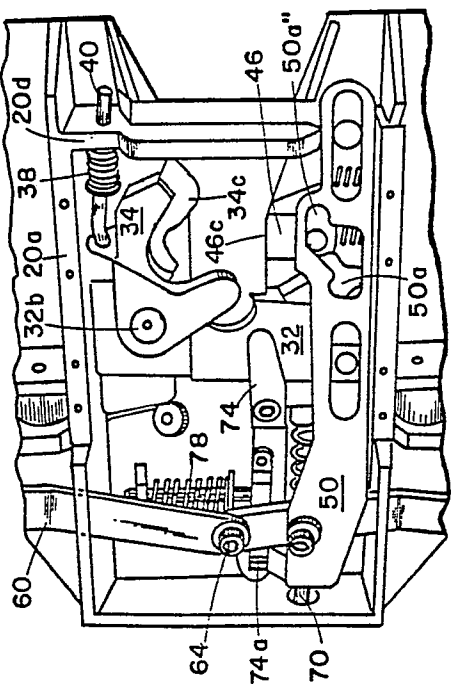


FIG 2

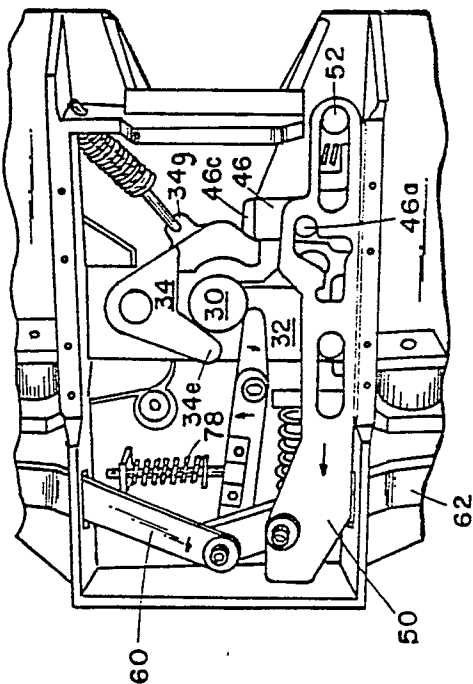


FIG 4

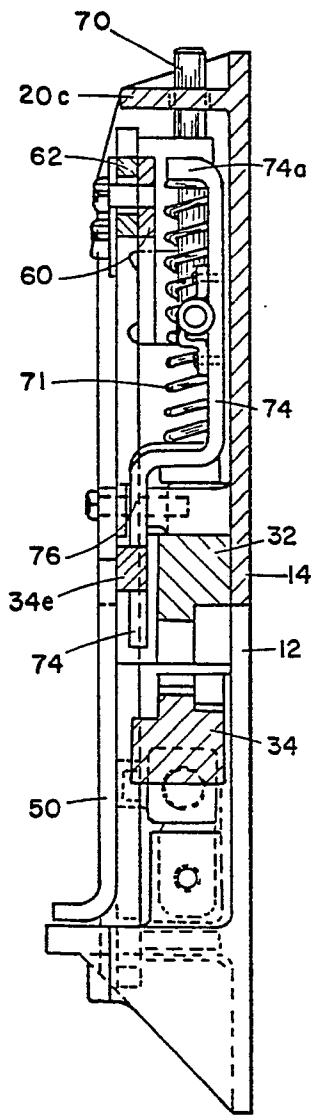


FIG 6

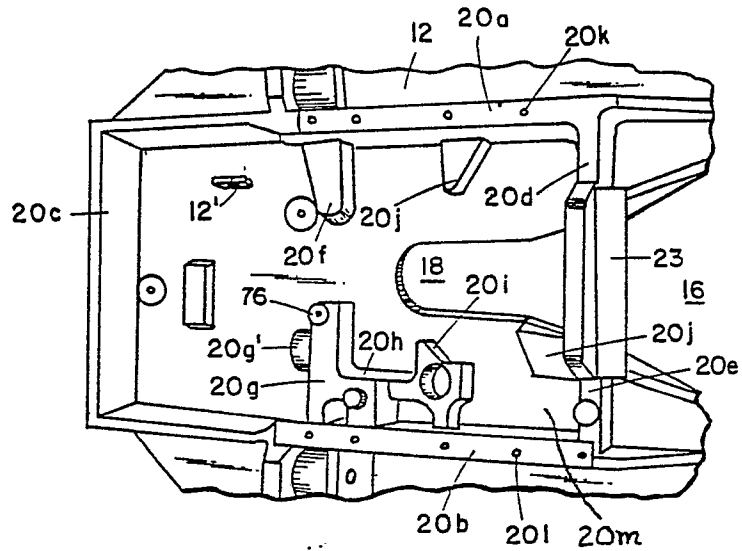


FIG 7

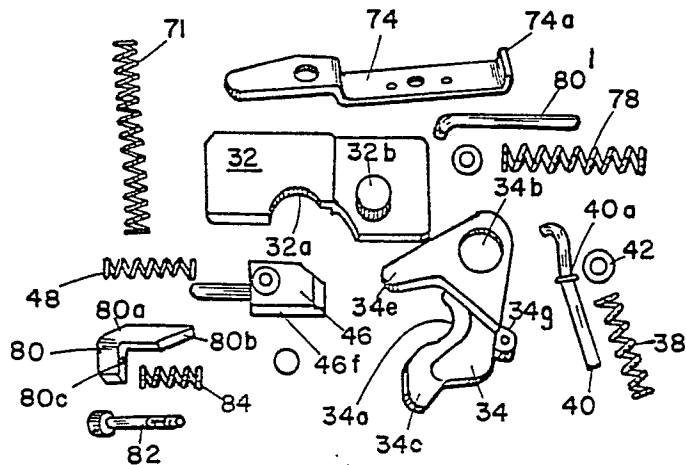


FIG 8